

Claims

What is claimed is:

1. A method of testing a software component comprising:

creating an abstraction matrix that describes the software component, the abstraction matrix comprising state and event information;

parsing the abstraction matrix to generate test cases and mapped expected results therefore;

separating the test cases based on layers of the software component, and associating data structures with the separated test cases of the layers, the data structures allowing the test cases of the various layers to be uncorrelated;

employing the software component in executable form to generate for each layer of the software component test case execution threads from the test cases and mapped expected results for that layer; and

executing in parallel at least some of the test case execution threads for at least one layer of the software component, thereby testing the software component.

2. The method of claim 1, wherein the creating of the abstraction matrix comprises creating the abstraction matrix from a functional specification of the software component.

3. The method of claim 1, wherein the parsing, the separating, the employing and the executing comprise automated processes.

4. The method of claim 1, wherein the executing comprises executing in parallel at least some of the test case execution threads for multiple layers of the software component.

5. The method of claim 4, wherein the executing comprises executing in parallel at least some test case execution threads of each layer of the software component.

6. The method of claim 1, wherein the separating the test cases based on layers of the software component results in each layer of the software component having multiple test cases associated therewith.

7. The method of claim 1, wherein the creating comprises creating the abstraction matrix so that the abstraction matrix describes each layer of the software component.

8. The method of claim 7, wherein the creating comprises creating a separate abstraction file for each layer of the layers of the software component.

9. The method of claim 1, further comprising providing attributes for use in generating the test cases and mapped expected results therefore.

10. The method of claim 1, wherein the creating comprises creating the abstraction matrix to comprise state information and events that are associated with each state of the software component.

11. The method of claim 10, wherein the creating comprises creating the abstraction matrix to include current state information and next state information, and wherein for at least one current state the event information comprises an event which leads from that current state to at least one next state.

12. The method of claim 1, wherein the software component comprises an operating system component.

13. The method of claim 1, wherein the creating comprises creating the abstraction matrix to identify a minimal number of states required to model the software component.

14. The method of claim 1, wherein the associating data structures for the separated test cases of the layers comprises associating information on the relationships between layers, thus allowing test cases of the various layers to be uncorrelated.

15. A method of generating test cases for use in testing a software component, said method comprising:

ascertaining a functional specification of the software component;

creating an abstraction matrix that describes the software component using the functional specification, the abstraction matrix comprising state and event information;

parsing the abstraction matrix to generate test cases and mapped expected results therefore; and

separating the test cases based on layers of the software component, and associating data structures with the separated test cases of the layers, the data structures allowing the test cases of the various layers to be uncorrelated.

16. The method of claim 15, wherein the parsing and the separating comprise automated processes.

17. The method of claim 15, wherein the creating comprises creating a separate abstraction file for each layer of the layers of the software component.

18. The method of claim 15, wherein the creating comprises creating the abstraction matrix to include current state information and next state information, and wherein for at least one current state the event information comprises an event which leads from that current state to at least one next state.

19. The method of claim 15, wherein the associating data structures for the separated test cases of the layers comprises associating information on the relationships between layers, thus allowing test cases of the various layers to be uncorrelated.

20. A system for testing a software component comprising:

an abstraction matrix that describes the software component, the abstraction matrix comprising state and event information;

means for parsing the abstraction matrix to generate test cases and mapped expected results therefore;

means for separating the test cases based on layers of the software component, and for associating data structures with the separated test cases of the layers, the data structures allowing the test cases of the various layers to be uncorrelated;

means for employing the software component in executable form to generate for each layer of the software component test case execution threads from the test cases and mapped expected results for that layer; and

means for executing in parallel at least some of the test case execution threads for at least one layer of the software component, thereby testing the software component.

21. The system of claim 20, wherein the abstraction matrix is created from a functional specification of the software component.

22. The system of claim 20, wherein the means for parsing, the means for separating, the means for employing and the means for executing comprise automated means.

23. The system of claim 20, wherein the means for executing comprises means for executing in parallel at least some of the test case execution threads for multiple layers of the software component.

24. The system of claim 23, wherein the means for executing comprises means for executing in parallel at least some test case execution threads of each layer of the software component.

25. The system of claim 20, wherein the means for separating the test cases based on layers of the software component results in each layer of the software component having multiple test cases associated therewith.

26. The system of claim 20, wherein the abstraction matrix describes each layer of the software component.

27. The system of claim 26, wherein the abstraction matrix comprises a separate abstraction file for each layer of the layers of the software component.

28. The system of claim 20, further comprising means for providing attributes for use in generating the test cases and mapped expected results therefore.

29. The system of claim 20, wherein the abstraction matrix comprises state information and events that are associated with each state of the software component.

30. The system of claim 29, wherein the abstraction matrix includes current state information and next state information, and wherein for at least one current state the event information comprises an event which leads from that current state to at least one next state.

31. The system of claim 20, wherein the software component comprises an operating system component.

32. The system of claim 20, wherein the abstraction matrix identifies a minimal number of states required to model the software component.

33. The system of claim 20, wherein the means for associating data structures for the separated test cases of the layers comprises means for associating information on the relationships between layers, thus allowing test cases of the various layers to be uncorrelated.

34. A system for testing a software component employing an abstraction matrix that describes the software component, the abstraction matrix comprising state and event information, the system comprising:

an abstraction engine for parsing the abstraction matrix and generating test cases and mapped expected results therefore;

wherein the abstraction engine separates the test cases based on layers of the software component, and associates data structures with the separated test cases of the layers, the data structures allowing the test cases of the various layers to be uncorrelated; and

a functional verification test engine adapted to take the software component in executable form and generate for each layer of the software component test case execution threads from the test cases and mapped expected results for that layer, wherein the functional test verification engine outputs in parallel at least some test case execution threads for at least one layer of the software component, thereby allowing testing of the software component.

35. A system for generating test cases for use in testing a software component, said system comprising:

a functional specification of the software component;

an abstraction matrix that describes the software component, the abstraction matrix comprising state and event information, and having been created from the functional specification;

means for parsing the abstraction matrix to generate test cases and mapped expected results therefore; and

means for separating the test cases based on layers of the software component, and for associating data structures with the separated test cases of the layers, the data structures allowing the test cases of the various layers to be uncorrelated.

36. The system of claim 35, wherein the means for parsing and the means for separating comprise automated means.

37. The system of claim 35, wherein the abstraction matrix comprises a separate abstraction file for each layer of the layers of the software component.

38. The system of claim 35, wherein the abstraction matrix includes current state information and next state information, and wherein for at least one current state the event information comprises an event which leads from that current state to at least one next state.

39. The system of claim 35, wherein the means for associating data structures for the separated test cases of the layers comprises means for associating information on the relationships between layers, thus allowing test cases of the various layers to be uncorrelated.

40. A system for generating test cases for use in testing a software component, the system comprising:

a storage medium for storing an abstraction matrix that describes the software component, the abstraction matrix, which comprises state and event information, having been created from a functional specification of the software component;

an abstraction engine for automatically retrieving and parsing the abstraction matrix to generate test cases and mapped expected results therefore; and

wherein the abstraction engine separates the test cases based on layers of the software component and associates data structures with the separated test cases of the layers, the data structures allowing the test cases of the various layers to be uncorrelated.

41. At least one program storage device readable by machine, tangibly embodying at least one program of instructions executable by the machine to form a method for testing a software component, comprising:

storing an abstraction matrix that describes the software component, the abstraction matrix comprising state and event information;

parsing the abstraction matrix to generate test cases and mapped expected results therefore;

separating the test cases based on layers of the software component, and associating data structures with the separated test cases of the layers, the data structures allowing the test cases of the various layers to be uncorrelated;

employing the software component in executable form to generate for each layer of the software component test case execution threads from the test cases and mapped expected results for that layer; and

executing in parallel at least some of the test case execution threads for at least one layer of the software component, thereby testing the software component.

42. The at least one program storage device of claim 41, wherein the executing comprises executing in parallel at least some of the test case execution threads for multiple layers of the software component.

43. The at least one program storage device of claim 42, wherein the executing comprises executing in parallel at least some test case execution threads of each layer of the software component.

44. The at least one program storage device of claim 41, wherein the separating the test cases based on layers of the software component results in each layer of the software component having multiple test cases associated therewith.

45. The at least one program storage device of claim 41, wherein abstraction matrix describes each layer of the software component.

46. The at least one program storage device of claim 45, wherein the abstraction matrix comprises a separate abstraction file for each layer of the layers of the software component.

47. The at least one program storage device of claim 41, wherein the abstraction matrix comprises state information and events that are associated with each state of the software component.

48. The at least one program storage device of claim 47, wherein the abstraction matrix includes current state information and next state information, and wherein for at least one current state the event information comprises an event which leads from that current state to at least one next state.

49. The at least one program storage device of claim 41, wherein the software component comprises an operating system component.

50. The at least one program storage device of claim 41, wherein the associating data structures for the separated test cases of the layers comprises associating information on the relationships between layers, thus allowing test cases of the various layers to be uncorrelated.

51. At least one program storage device readable by a machine, tangibly embodying at least one program of instructions executable by the machine to perform a method for generating test cases for use in testing a software component, the method comprising:

storing an abstraction matrix of the software component, the abstraction matrix comprising state and event information;

parsing the abstraction matrix to generate test cases and mapped expected results therefore; and

separating the test cases based on layers of the software component, and associating data structures with the separated test cases of the layers, the data structures allowing the test cases of the various layers to be uncorrelated.

52. The at least one program storage device of claim 51, wherein the abstraction matrix comprises a separate abstraction file for each layer of the layers of the software component.

53. The at least one program storage device of claim 51, wherein the abstraction matrix includes current state information and next state information, and wherein for at least one current state the event information comprises an event which leads from that current state to at least one next state.

54. The at least one program storage device of claim 51, wherein the associating data structures for the separated test cases of the layers comprises associating information on the relationships between layers, thus allowing test cases of the various layers to be uncorrelated.

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